U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

PB-253 082

HOOVER RESERVOIR, DELAWARE AND FRANKLIN COUNTIES, OHIO

PACIFIC NORTHWEST ENVIRONMENTAL RESEARCH LABORATORY

PREPARED FOR
NATIONAL ENVIRONMENTAL RESEARCH CENTER

JUNE 1975

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO. PB-253 082
4. TITLE AND SUBTITLE Report on Hoover Reservoir, Delaware and Franklin Counties, Ohio		5. REPORT DATE Prepared June 1975
		6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) Anonymous (National Eutrophication Survey Staff)		8. PERFORMING ORGANIZATION REPORT NO. Working Paper # 403
9. PERFORMING ORGANIZATION NAME AND ADDRESS National Eutrophication Survey U.S. Environmental Protection Agency 200 S. W. 35th St. Corvallis, Oregon 97330		10. PROGRAM ELEMENT NO.
		11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS Office of Research and Development U.S. Environmental Protection Agency 401 M Street, S. W. Washington, DC 20460		13. TYPE OF REPORT AND PERIOD COVERED Final - 1973
		14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES
Prepared in cooperation with the U.S. Environmental Protection Agency, National Environmental Research Center, Las Vegas, Nevada 89114

16. ABSTRACT

Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
eutrophication lakes nutrients phosphorus nitrogen loading		05B 05C

18. DISTRIBUTION STATEMENT Release unlimited	19. SECURITY CLASS *(This Report)*	21. NO. OF PAGES 40
	20. SECURITY CLASS *(This page)*	22. PRICE

EPA Form 2220-1 (9-73)

153113

PB 253 082

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL EUTROPHICATION SURVEY

WORKING PAPER SERIES

REPORT

ON

HOOVER RESERVOIR

DELAWARE AND FRANKLIN COUNTIES

OHIO

EPA REGION V

WORKING PAPER No. 403

PACIFIC NORTHWEST ENVIRONMENTAL RESEARCH LABORATORY

An Associate Laboratory of the

NATIONAL ENVIRONMENTAL RESEARCH CENTER - CORVALLIS, OREGON

and

NATIONAL ENVIRONMENTAL RESEARCH CENTER - LAS VEGAS, NEVADA

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

☆GPO—697-032

Report

on

Hoover Reservoir

Delaware and Franklin Counties

Ohio

EPA Region V

Working Paper No. 403

With the cooperation of the

Ohio Environmental Protection Agency

and the

Ohio National Guard

June, 1975

CONTENTS

	Page
Foreword	ii
List of Ohio Study Lakes	iv
Lake and Drainage Area Map	v
Sections	
I. Conclusions	1
II. Lake and Drainage Basin Characteristics	3
III. Lake Water Quality Summary	4
IV. Nutrient Loadings	8
V. Literature Reviewed	13
VI. Appendices	14

FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to fresh water lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point-source discharge reduction and non-point source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's fresh water lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by EPA and to augment plans implementation by the states.

ACKNOWLEDGMENT

The staff of the National Eutrophication Survey (Office of Research & Development, U. S. Environmental Protection Agency) expresses sincere appreciation to the Ohio Environmental Protection Agency for professional involvement, to the Ohio National Guard for conducting the tributary sampling phase of the Survey, and to those Ohio wastewater treatment plant operators who provided effluent samples and flow data.

Ned Williams, Director, and Tom Birch, Ken Carr, Larry Dietrick, Ron Havlice, Larry Korecko, Rod Mehlhop, Terry Wheeler, and John Youger, Ohio Environmental Protection Agency, provided invaluable lake documentation and counsel during the Survey, reviewed the preliminary reports, and provided critiques most useful in the preparation of this Working Paper series.

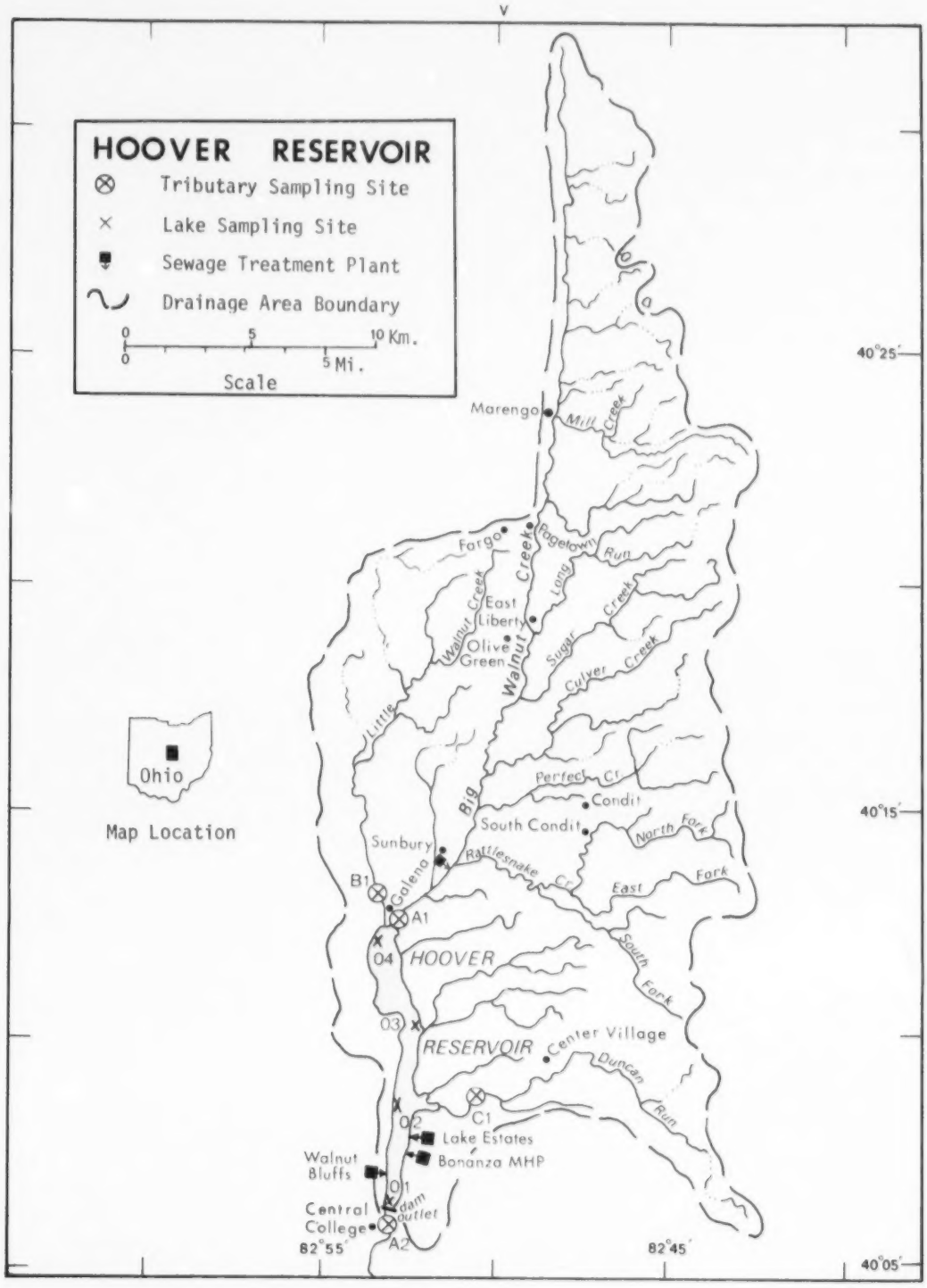
Major General Dana L. Stewart, then the Adjutant General of Ohio, and Project Officer Lt. Colonel Robert C. Timmons, who directed the volunteer efforts of the Ohio National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF OHIO

LAKE NAME	COUNTY
Atwood	Carroll, Tuscarawas
Beach City	Stark, Tuscarawas
Berlin	Mahoning, Portage, Stark
Buckeye	Fairfield, Licking, Perry
Charles Mill	Ashland, Richland
Deer Creek	Fayette, Pickaway
Delaware	Delaware
Dillon	Muskingum
Grand Lake of St. Marys	Auglaize, Mercer
Grant	Brown
Holiday	Huron
Hoover	Delaware, Franklin
Indian	Logan
Loramie	Auglaize, Shelby
Mosquito Creek	Trumbull
O'Shaughnessy	Delaware
Pymatuning	Ashtabula, OH; Crawford, PA
Pleasant Hill	Ashland, Richland
Rocky Fork	Highland
Shawnee	Greene
Tappan	Harrison


HOOVER RESERVOIR
Tributary Sampling Site
Lake Sampling Site
Sewage Treatment Plant
Drainage Area Boundary
0 5 10 Km.
0 5 Mi.
Scale
Ohio
Map Location
Marengo
Mill Creek
Fargo
Pagetown Run
Big Walnut Creek
Long Creek
East Liberty
Walnut Creek
Olive Green
Sugar Creek
Culver Creek
Little
Perfect Cr
Condit
South Condit
North Fork
Sunbury
Rattlesnake Cr
East Fork
Galena
B1
A1
O4
HOOVER
South Fork
O3
RESERVOIR
Center Village
Duncan Run
C1
O2
Lake Estates
Bonanza MHP
Walnut Bluffs
O1
Central College
dam outlet
A2
82°55'
82°45'
40°25'
40°15'
40°05'

HOOVER RESERVOIR

STORET NO. 3914

I. CONCLUSIONS

A. Trophic Condition:

Survey data indicate that Hoover Reservoir is eutrophic. It ranked fifth in overall trophic quality when the 20 Ohio lakes sampled in 1973 were compared using a combination of six parameters*. Two of the lakes had less and one had the same median total phosphorus, four had less median dissolved phosphorus, 14 had less inorganic nitrogen, four had less mean chlorophyll a, and two had greater Secchi disc transparency. Depression of dissolved oxygen with depth occurred at three of the four sampling stations in August and October.

Survey limnologists noted concentrations of algae at two of the four sampling sites in April.

B. Rate-Limiting Nutrient:

The algal assay results indicate that the primary productivity in Hoover Reservoir was limited by phosphorus at the time the sample was taken (04/26/73). The lake data indicate phosphorus limitation at the other sampling times as well.

C. Nutrient Controllability:

1. Point sources--During the sampling year, known point sources accounted for 27.5% of the total phosphorus load reaching Hoover Reservoir. The wastewater treatment plant at Sunbury

---

* See Appendix A.

contributed 14.3%, Walnut Bluffs contributed 4.8%, Lake Estates contributed 2.7%, and the Bonanza Mobile Home Park contributed 2.5% of this total. The town of Galena is estimated to have contributed 3.2%.

Two industrial point sources of probable nutrient significance discharge to Big Walnut Creek (Youger, 1975). No information is available on the nutrient contributions of these sources; however, the loads are included in those measured in the creek at station A-1.

The present phosphorus loading of 1.74 $g/m^2/yr$ is more than two times that proposed by Vollenweider (Vollenweider and Dillon, 1974) as a eutrophic loading (see page 12). Because the reservoir is phosphorus limited, all phosphorus inputs should be minimized to the greatest practicable extent to slow the eutrophication now occurring in Hoover Reservoir.

2. Non-point sources--Non-point sources accounted for 72.5% of the total phosphorus load. Big Walnut Creek contributed 44.9%, Little Walnut Creek contributed 11.7%, and Duncan Run contributed 4.9% of the total. Ungaged tributaries were estimated to have contributed 10.0% of the total phosphorus input.

The phosphorus export rate of Big Walnut Creek was a little higher than the rates of the other two sampled tributaries (see page 12). The higher rate may be due to the unmeasured industrial point sources noted above.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS†

A. Lake Morphometry††:

1. Surface area: 11.43 kilometers^2.
2. Mean depth: 6.5 meters.
3. Maximum depth: >17.6 meters.
4. Volume: 74.295 x 10^6 m^3.
5. Mean hydraulic retention time: 179 days (based on outlet flow).

B. Tributary and Outlet:
(See Appendix C for flow data)

1. Tributaries -

Name	Drainage area (km^2)*	Mean flow (m^3/sec)*
Big Walnut Creek	284.9	2.8
Little Walnut Creek	83.1	0.8
Duncan Run	38.1	0.4
Minor tributaries & Immediate drainage -	74.6	0.9
Totals	480.7	4.9

2. Outlet -

Big Walnut Creek	492.1**	4.8

C. Precipitation***:

1. Year of sampling: 119.9 centimeters.
2. Mean annual: 93.7 centimeters.

---

† Table of metric conversions--Appendix B.
†† Youger, 1975.
* For limits of accuracy, see Working Paper No. 175, "...Survey Methods, 1973-1976".
** Includes area of lake.
*** See Working Paper No. 175.

III. LAKE WATER QUALITY SUMMARY

Hoover Reservoir was sampled three times during the open-water season of 1973 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from four stations on the lake and from a number of depths at each station (see map, page v). During each visit, a single depth-integrated (4.6 m or near bottom to surface) sample was composited from the stations for phytoplankton identification and enumeration; and during the first visit, a single 18.9-liter depth-integrated sample was composited for algal assays. Also each time, a depth-integrated sample was collected from each of the stations for chlorophyll a analysis. The maximum depths sampled were 17.7 meters at station 1, 15.2 meters at station 2, 10.7 meters at station 3, and 3.4 meters at station 4.

The lake sampling results are presented in full in Appendix D and are summarized in the following table.

A. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR HOOVER RESERVOIR
STORET CODE 3914

	1ST SAMPLING (4/26/73) 4 SITES			2ND SAMPLING (8/ 1/73) 4 SITES			3RD SAMPLING (10/10/73) 4 SITES		
PARAMETER	RANGE	MEAN	MEDIAN	RANGE	MEAN	MEDIAN	RANGE	MEAN	MEDIAN
TEMP (C)	9.1 - 13.6	12.2	12.7	13.0 - 25.6	22.6	24.3	12.5 - 21.0	18.7	19.7
DISS OXY (MG/L)	8.3 - 12.3	10.5	10.5	0.2 - 8.6	3.6	2.3	0.2 - 9.6	4.9	5.8
CNDCTVY (MCROMO)	340. - 400.	353.	345.	200. - 309.	275.	278.	275. - 448.	304.	282.
PH (STAND UNITS)	7.0 - 8.6	8.1	8.1	7.2 - 8.6	7.8	7.7	7.1 - 8.5	7.6	7.6
TOT ALK (MG/L)	89. - 107.	93.	91.	78. - 117.	90.	85.	90. - 130.	101.	97.
TOT P (MG/L)	0.028 - 0.081	0.048	0.044	0.023 - 0.138	0.045	0.037	0.018 - 0.131	0.052	0.033
ORTHO P (MG/L)	0.002 - 0.014	0.006	0.005	0.005 - 0.020	0.009	0.008	0.007 - 0.030	0.015	0.015
NO2+NO3 (MG/L)	1.300 - 2.000	1.681	1.700	0.450 - 1.820	1.498	1.620	0.060 - 1.050	0.826	0.940
AMMONIA (MG/L)	0.030 - 0.100	0.056	0.050	0.050 - 0.620	0.136	0.070	0.040 - 1.200	0.209	0.070
KJEL N (MG/L)	0.400 - 1.000	0.624	0.600	0.600 - 1.600	0.900	0.800	0.400 - 2.000	0.973	0.800
INORG N (MG/L)	1.400 - 2.070	1.737	1.740	1.070 - 1.920	1.634	1.680	0.740 - 1.520	1.035	1.040
TOTAL N (MG/L)	1.900 - 2.600	2.305	2.300	1.660 - 2.720	2.398	2.450	1.420 - 2.260	1.799	1.740
CHLRPYL A (UG/L)	7.2 - 36.3	17.6	13.5	7.6 - 10.9	8.5	7.8	2.8 - 40.9	12.9	3.9
SECCHI (METERS)	0.4 - 0.9	0.8	0.9	0.5 - 1.0	0.8	0.9	0.5 - 1.6	1.2	1.4

B. Biological characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Algal Units per ml
04/26/73	1. Flagellates	9,547
	2. *Melosira sp.*	2,815
	3. *Cryptomonas sp.*	1,332
	4. *Stephanodiscus sp.*	993
	5. Pennate diatoms	151
	Other genera	273
	Total	15,111
08/01/73	1. *Melosira sp.*	829
	2. Flagellates	353
	3. *Stephanodiscus sp.*	207
	4. *Cryptomonas sp.*	124
	5. *Trachelomonas sp.*	62
	Other genera	126
	Total	1,701
10/10/73	1. Flagellates	1,157
	2. *Melosira sp.*	579
	3. *Cryptomonas sp.*	386
	4. *Cyclotella sp.*	265
	5. *Synedra sp.*	241
	Other genera	481
	Total	3,109

2. Chlorophyll *a* -

Sampling Date	Station Number	Chlorophyll *a* (μg/l)
04/26/73	01	36.3
	02	18.6
	03	8.4
	04	7.2
08/01/73	01	7.6
	02	7.7
	03	8.0
	04	10.9
10/10/73	01	4.0
	02	2.8
	03	3.8
	04	40.9

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked -

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum yield (mg/l-dry wt.)
Control	0.008	0.638	1.8
0.050 P	0.058	0.638	19.1
0.050 P + 1.0 N	0.058	1.638	19.2
1.0 N	0.008	1.638	1.2

2. Filtered and nutrient spiked -

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum yield (mg/l-dry wt.)
Control	0.015	1.540	0.8
0.050 P	0.065	1.540	21.5
0.050 P + 1.0 N	0.065	2.540	24.9
1.0 N	0.015	2.540	0.6

3. Discussion -

The control yields of the assay alga, Selenastrum capricornutum, indicate that the potential primary productivity of Hoover Reservoir was moderate to moderately high at the time the sample was taken (04/26/73). Also, significant increases in yields with the addition of phosphorus indicate that the reservoir was limited by phosphorus at that time. Note that the addition of nitrogen alone did not result in yields significantly different than those of the controls.

The lake data substantiate phosphorus limitation; i.e., the mean inorganic nitrogen/orthophosphorus ratios were 50/1 or greater at all sampling stations and times.

IV. NUTRIENT LOADINGS
(See Appendix E for data)

For the determination of nutrient loadings, the Ohio National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the map (page v), except for the high runoff months of February and March when two samples were collected. Sampling was begun in May, 1973, and was completed in April, 1974.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the Ohio District Office of the U.S. Geological Survey for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries were determined by using a modification of a U.S. Geological Survey computer program for calculating stream loadings*. Nutrient loads shown are those measured minus point-source loads, if any.

Nutrient loads for unsampled "minor tributaries and immediate drainage" ("ZZ" of U.S.G.S.) were estimated using the means of the nutrient exports, in $kg/km^2/year$, at stations B-1 and C-1 and multiplying the means by the ZZ area in km^2.

The community of Sunbury did not participate in the sampling program, and nutrient loads were estimated at 1.134 kg P and 3.401 kg N/capita/year. The nutrient loads in the untreated wastes of Galena were estimated at 1.587 kg P and 4.263 kg N/capita/year.

---

* See Working Paper No. 175.

Nutrient loads from the Walnut Bluffs, Lake Estates, and Bonanza Mobile Home Park wastewater treatment plants were calculated using the daily loads provided by the Ohio Environmental Protection Agency (Youger, 1975); however, the nitrogen loads shown are based on total Kjeldahl nitrogen only.

A. Waste Sources:

1. Known Municipal -

Name	Pop. Served	Treatment	Mean Flow (m^3/d)	Receiving Water
Sunbury	2,512*	ext. aer.	950.8	Big Walnut Creek
Galena	361*	none	136.6	Big Walnut Creek
Walnut Bluffs**	360	ext. aer. + sand fltr.	136.3	Hoover Reservoir
Lake Estates**	700	ext. aer. + pond	265.0	Hoover Reservoir
Bonanza MHP**	400	ext. aer. + pond	151.4	Hoover Reservoir

2. Known industrial** -

Name	Product	Treatment	Mean Flow (m^3/d)	Receiving Water
Hoffman Custom Slaughtering, Marengo	meat processing	?	?	Big Walnut Creek
Nestle Co., Sunbury	freeze-dried coffee	?	208.2	Big Walnut Creek

* Anonymous, 1971 (populations are 1970 Census; flows are estimated at 0.3785 m^3/capita/day).
** Youger, 1975; population estimated from flow (0.3785 m^3/capita/day).

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	kg P/ yr	% of total
a. Tributaries (non-point load) -		
Big Walnut Creek	8,930	44.9
Little Walnut Creek	2,315	11.7
Duncan Run	965	4.9
b. Minor tributaries & immediate drainage (non-point load) -	1,985	10.0
c. Known municipal STP's -		
Sunbury	2,850	14.3
Galena	575	2.9
Walnut Bluffs	960	4.8
Lake Estates	545	2.7
Bonanza MHP	495	2.5
d. Septic tanks* -	50	0.3
e. Known industrial -		
Hoffman Custom Slaughtering, Marengo	?	-
Nestle Co., Sunbury	?	-
f. Direct precipitation** -	200	1.0
Total	19,870	100.0

2. Outputs -

Lake outlet - Big Walnut Creek 6,985

3. Net annual P accumulation - 12,885 kg.

* Estimate based on 176 lakeshore dwellings; see Working Paper No. 175.
** See Working Paper No. 175.

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg N/ yr	% of total
a. Tributaries (non-point load) -		
Big Walnut Creek	193,535	51.7
Little Walnut Creek	65,235	17.4
Duncan Run	29,085	7.8
B. Minor tributaries & immediate drainage (non-point load) -	57,755	15.4
c. Known municipal STP's -		
Sunbury	8,545	2.3
Galena	1,540†	0.4
Walnut Bluffs	2,880†	0.8
Lake Estates	1,655†	0.4
Bonanza MHP	100†	<0.1
d. Septic tanks* -	1,875	0.5
e. Known industrial -		
Hoffman Custom Slaughtering, Marengo	?	-
Nestle Co., Sunbury	?	-
f. Direct precipitation** -	12,340	3.3
Total	374,545	100.0

2. Outputs -

Lake outlet - Big Walnut Creek 336,455

3. Net annual N accumulation - 38,090 kg.

† Total Kjeldahl nitrogen only.
* Estimate based on 176 lakeshore dwellings; see Working Paper No. 175.
** See Working Paper No. 175.

D. Mean Annual Non-point Nutrient Export by Subdrainage Area:

Tributary	kg P/km^2/yr	kg N/km^2/yr
Big Walnut Creek	31	679
Little Walnut Creek	28	785
Duncan Run	25	763

E. Yearly Loadings:

In the following table, the existing phosphorus loadings are compared to those proposed by Vollenweider (Vollenweider and Dillon, 1974). Essentially, his "dangerous" loading is one at which the receiving water would become eutrophic or remain eutrophic; his "permissible" loading is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A mesotrophic loading would be considered one between "dangerous" and "permissible".

Note that Vollenweider's model may not be applicable to water bodies with short hydraulic retention times.

	Total Phosphorus		Total Nitrogen	
	Total	Accumulated	Total	Accumulated
grams/m^2/yr	1.74	1.13	32.8	3.3

Vollenweider phosphorus loadings (g/m^2/yr) based on mean depth and mean hydraulic retention time of Hoover Reservoir:

"Dangerous" (eutrophic loading)	0.70
"Permissible" (oligotrophic loading)	0.35

V. LITERATURE REVIEWED

Anonymous, 1971. Inventory of municipal waste facilities. EPA Publ. OWP-1, vol. 5, Washington, DC.

Vollenweider, R. A., and P. J. Dillon, 1974. The application of the phosphorus loading concept to eutrophication research. Natl. Res. Council of Canada Publ. No. 13690, Canada Centre for Inland Waters, Burlington, Ontario.

Youger, John, 1975. Personal communication (lake morphometry; point sources and loads). OH Env. Prot. Agency, Columbus.

VI. APPENDICES

APPENDIX A

LAKE RANKINGS

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P
3901	BEACH CITY RESERVOIR	0.122	1.990	489.000	10.867	11.600	0.015
3902	BUCKEYE LAKE	0.179	0.380	490.000	186.567	9.600	0.020
3905	CHARLES MILL RESERVOIR	0.127	0.465	482.555	67.144	15.000	0.011
3906	DEER CREEK RESERVOIR	0.098	2.980	470.125	9.887	13.900	0.036
3907	DELAWARE RESERVOIR	0.086	2.340	484.111	10.856	14.500	0.024
3908	DILLION RESERVOIR	0.163	1.590	481.250	27.400	14.300	0.037
3912	GRANT LAKE	0.113	0.570	486.333	40.533	12.200	0.019
3914	HOOVER RESERVOIR	0.040	1.640	462.750	13.017	14.800	0.008
3915	INDIAN LAKE	0.120	0.380	485.222	76.855	14.200	0.012
3917	LORAMIE LAKE	0.185	1.380	494.000	104.100	8.200	0.019
3921	MOSQUITO CREEK RESERVOIR	0.058	0.150	465.333	36.267	11.600	0.006
3924	PLEASANT HILL LAKE	0.036	0.455	456.833	22.850	14.700	0.010
3927	LAKE SAINT MARYS	0.148	0.200	484.167	79.150	8.200	0.014
3928	ATWOOD RESERVOIR	0.031	0.205	462.000	16.442	14.700	0.005
3929	BERLIN RESERVOIR	0.042	0.900	465.435	15.496	13.600	0.006
3930	HOLIDAY LAKE	0.125	0.575	465.333	55.350	15.000	0.034
3931	O'SHAUGNESSY RESERVOIR	0.208	3.070	479.333	5.522	14.900	0.159
3932	ROCKY FORK LAKE	0.067	0.790	473.000	38.022	15.000	0.010
3933	SHAWNEE LAKE	0.069	2.380	474.333	39.567	15.000	0.009
3934	TAPPAN LAKE	0.040	0.280	466.111	37.711	15.000	0.007

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P	INDEX NO
3901	BEACH CITY RESERVOIR	37 (7)	21 (4)	11 (2)	84 (16)	82 (15)	42 (8)	277
3902	BUCKEYE LAKE	11 (2)	76 (14)	5 (1)	0 (0)	89 (17)	26 (5)	207
3905	CHARLES MILL RESERVOIR	26 (5)	63 (12)	37 (7)	21 (4)	11 (0)	58 (11)	216
3906	DEER CREEK RESERVOIR	53 (10)	5 (1)	63 (12)	95 (18)	63 (12)	11 (2)	290
3907	DELAWARE RESERVOIR	58 (11)	16 (3)	32 (6)	89 (17)	47 (9)	21 (4)	263
3908	DILLION RESERVOIR	16 (3)	32 (6)	42 (8)	58 (11)	53 (10)	5 (1)	206
3912	GRANT LAKE	47 (9)	58 (11)	16 (3)	32 (6)	74 (14)	34 (6)	261
3914	HOOVER RESERVOIR	87 (16)	26 (5)	89 (17)	79 (15)	32 (6)	79 (15)	392
3915	INDIAN LAKE	42 (8)	76 (14)	21 (4)	16 (3)	58 (11)	53 (10)	266
3917	LORAMIE LAKE	5 (1)	37 (7)	0 (0)	5 (1)	97 (18)	34 (6)	178
3921	MOSQUITO CREEK RESERVOIR	74 (14)	100 (19)	82 (15)	53 (10)	82 (15)	92 (17)	483
3924	PLEASANT HILL LAKE	95 (18)	68 (13)	100 (19)	63 (12)	39 (7)	66 (12)	431
3927	LAKE SAINT MARYS	21 (4)	95 (18)	26 (5)	11 (2)	97 (18)	47 (9)	297
3928	ATWOOD RESERVOIR	100 (19)	89 (17)	95 (18)	68 (13)	39 (7)	100 (19)	491
3929	BERLIN RESERVOIR	79 (15)	42 (8)	74 (14)	74 (14)	68 (13)	92 (17)	429
3930	HOLIDAY LAKE	32 (6)	53 (10)	82 (15)	26 (5)	11 (0)	16 (3)	220
3931	O'SHAUGNESSY RESERVOIR	0 (0)	0 (0)	47 (9)	100 (19)	26 (5)	0 (0)	173
3932	ROCKY FORK LAKE	68 (13)	47 (9)	58 (11)	42 (8)	11 (0)	66 (12)	292
3933	SHAWNEE LAKE	63 (12)	11 (2)	53 (10)	37 (7)	11 (0)	74 (14)	249
3934	TAPPAN LAKE	87 (16)	84 (16)	68 (13)	47 (9)	11 (0)	84 (16)	381

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
1	3928	ATWOOD RESERVOIR	491
2	3921	MOSQUITO CREEK RESERVOIR	483
3	3924	PLEASANT HILL LAKE	431
4	3929	BERLIN RESERVOIR	429
5	3914	HOOVER RESERVOIR	392
6	3934	TAPPAN LAKE	381
7	3927	LAKE SAINT MARYS	297
8	3932	ROCKY FORK LAKE	292
9	3906	DEER CREEK RESERVOIR	290
10	3901	BEACH CITY RESERVOIR	277
11	3915	INDIAN LAKE	266
12	3907	DELAWARE RESERVOIR	263
13	3912	GRANT LAKE	261
14	3933	SHAWNEE LAKE	249
15	3930	HOLIDAY LAKE	220
16	3905	CHARLES MILL RESERVOIR	216
17	3902	BUCKEYE LAKE	207
18	3908	DILLION RESERVOIR	206
19	3917	LORAMIE LAKE	178
20	3931	O'SHAUGNESSY RESERVOIR	173

APPENDIX B

CONVERSION FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX C

TRIBUTARY FLOW DATA

TRIBUTARY FLOW INFORMATION FOR OHIO 1/27/75

LAKE CODE 3914 HOOVER RESERVOIR

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 492.1

NORMALIZED FLOWS(CMS)

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
3914A1	284.9	4.47	5.04	6.74	5.38	3.20	1.98	1.22	0.71	0.54	0.59	1.25	2.52	2.79
3914A2	492.1	4.76	6.14	9.77	10.25	7.48	4.16	3.60	2.46	2.21	2.04	1.87	2.83	4.79
3914B1	83.1	1.25	1.47	2.04	1.64	0.96	0.57	0.34	0.18	0.14	0.16	0.34	0.74	0.81
3914C1	38.1	0.59	0.71	0.93	0.76	0.45	0.25	0.16	0.09	0.06	0.07	0.15	0.34	0.38
3914ZZ	86.0	1.33	1.61	2.10	1.70	0.99	0.57	0.37	0.20	0.15	0.16	0.37	0.76	0.86

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 492.1
SUM OF SUB-DRAINAGE AREAS = 492.1

TOTAL FLOW IN = 58.34
TOTAL FLOW OUT = 57.57

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
3914A1	5	73	2.89	5	2.32				
	6	73	12.37	2	1.36				
	7	73	3.82	9	0.85				
	8	73	1.02	6	0.26				
	9	73	0.25	6	2.55				
	10	73	0.57	15	0.85				
	11	73	4.96	4	1.10				
	12	73	5.41	2	2.49				
	1	74	8.75	6	1.59				
	2	74	3.31	3	1.42	17	1.84		
	3	74	5.32	3	3.74	17	5.55		
	4	74	7.19	7	5.35				
3914A2	5	73	4.73	5	3.99				
	6	73	20.27	2	2.75				
	7	73	6.37	9	3.54				
	8	73	3.74	6	3.51				
	9	73	3.20	6	4.28				
	10	73	3.40	15	2.58				
	11	73	5.47	4	4.19				
	12	73	10.59	2	6.63				
	1	74	15.23	6	3.17				
	2	74	6.14	3	3.82	17	2.75		
	3	74	9.66	3	5.52	17	13.25		
	4	74	13.88	7	8.78				

TRIBUTARY FLOW INFORMATION FOR OHIO 1/27/75

LAKE CODE 3914 HOOVER RESERVOIR

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
3914B1	5	73	0.88	5	0.68				
	6	73	3.54	2	0.40				
	7	73	1.08	9	0.25				
	8	73	0.27	6	0.08				
	9	73	0.07	6	0.74				
	10	73	0.15	15	0.25				
	11	73	1.36	4	0.31				
	12	73	1.59	2	0.74				
	1	74	2.44	6	0.45				
	2	74	0.96	3	0.42	17	0.54		
	3	74	1.61	3	1.10	17	1.61		
	4	74	2.21	7	1.56				
3914C1	5	73	0.42	5	0.31				
	6	73	1.53	2	0.18				
	7	73	0.48	9	0.11				
	8	73	0.13	6	0.03				
	9	73	0.03	6	0.34				
	10	73	0.07	15	0.12				
	11	73	0.59	4	0.15				
	12	73	0.74	2	0.34				
	1	74	1.16	6	0.21				
	2	74	0.45	3	0.19	17	0.25		
	3	74	0.74	3	0.51	17	0.74		
	4	74	1.02	7	0.71				
3914ZZ	5	73	0.91						
	6	73	3.54						
	7	73	1.16						
	8	73	0.28						
	9	73	0.07						
	10	73	0.16						
	11	73	1.47						
	12	73	1.64						
	1	74	2.61						
	2	74	1.05						
	3	74	1.67						
	4	74	2.27						

APPENDIX D

PHYSICAL and CHEMICAL DATA

STORET RETRIEVAL DATE 75/01/27

391401
40 06 34.0 082 53 04.0
HOOVER RESERVOIR
39049 OHIO

11EPALES
3

2111202
0062 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/04/26	16 00	0000	13.3		36	340	8.50	91	0.040	0.900	1.700	0.003
	16 00	0005	13.1	12.2		340	8.60	91	0.040	0.600	1.700	0.007
	16 00	0015	13.4	12.2		340	8.60	90	0.040	0.700	1.700	0.005
	16 00	0022	13.0	12.1		340	8.60	89	0.040	0.600	1.700	0.008
	16 00	0030	13.0	12.3		340	8.60	90	0.040	0.700	1.700	0.010
	16 00	0045	10.9	10.5		360	8.20	91	0.040	0.500	1.900	0.005
	16 00	0058	9.1	10.1		360	8.10	94	0.070	0.400	2.000	0.013
73/08/01	17 45	0000	25.6		37	275	8.40	83	0.060	0.900	1.680	0.005
	17 45	0005	25.2	8.6		272	8.20	83	0.050	0.700	1.710	0.006
	17 45	0015	24.1	6.6		267	7.70	81	0.060	0.800	1.670	0.009
	17 45	0025	22.8	1.7		245	7.20	78	0.070	0.800	1.660	0.013
	17 45	0040	17.3	0.4		251	7.20	91	0.100	0.700	1.800	0.020
	17 45	0055	13.0	0.2		275	7.30	107	0.280	0.600	1.060	0.014
73/10/10	10 30	0000	19.9	6.6	64	277	7.90	96	0.490	0.400	1.030	0.007
	10 30	0015	19.8	6.4		276	7.80	96	0.040	0.500	1.050	0.013
	10 30	0030	19.7	5.8		275	7.60	95	0.050	0.600	0.990	0.016
	10 30	0040	19.2	3.2		277	7.30	97	0.080	0.600	0.940	0.015
	10 30	0045	15.4	0.2		285	7.10	109	0.460	1.100	0.320	0.012
	10 30	0055	12.9			291						
	10 30	0058	12.5	0.2		299	7.20	130	1.200	2.000	0.060	0.030

STORET RETRIEVAL DATE 75/01/27

391401
40 06 34.0 082 53 04.0
HOOVER RESERVOIR
39049 OHIO

11EPALES 2111202
3 0062 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/04/26	16 00	0000	0.047	36.3
	16 00	0006	0.053	
	16 00	0015	0.057	
	16 00	0022	0.056	
	16 00	0030	0.060	
	16 00	0045	0.030	
	16 00	0058	0.036	
73/08/01	17 45	0000	0.030	7.6
	17 45	0005	0.030	
	17 45	0015	0.026	
	17 45	0025	0.033	
	17 45	0040	0.042	
	17 45	0055	0.035	
73/10/10	10 30	0000	0.022	4.0
	10 30	0015	0.018	
	10 30	0030	0.018	
	10 30	0040	0.023	
	10 30	0045	0.058	
	10 30	0058	0.092	

STORET RETRIEVAL DATE 75/01/27

391402
40 08 47.0 082 52 43.0
HOOVER RESERVOIR
39041 OHIO

11EPALES 2111202
3 0044 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/04/26	16 45	0000	12.7		36	340	8.20	89	0.040	0.800	1.700	0.003
	16 45	0006	12.7	11.2		340	8.30	89	0.040	0.600	1.700	0.008
	16 45	0015	12.7	11.0		340	8.30	90	0.030	0.600	1.600	0.004
	16 45	0022	12.6	11.0		345	8.30	91	0.030	0.600	1.700	0.003
	16 45	0030	11.9	10.4		360	8.10	94	0.050	0.600	1.800	0.006
	16 45	0040	9.9	10.1		360	8.00	95	0.070	0.600	1.900	0.009
73/08/01	16 25	0000	25.0		40	281	8.30	87	0.050	0.990	1.620	0.005
	16 25	0005	24.7	7.5		278	8.00	85	0.060	0.800	1.620	0.005
	16 25	0015	24.3	4.9		274	7.60	85	0.070	0.700	1.690	0.005
	16 25	0025	22.7	1.1		200	7.20	84	0.100	0.900	1.820	0.009
	16 25	0050	14.6	0.6		282	7.30	117	0.620	1.600	0.450	0.008
73/10/10	11 05	0000	20.2	7.0	57	280	7.70	92	0.060	1.200	0.980	0.015
	11 05	0015	19.9	5.4		280	7.50	90	0.050	0.700	0.990	0.015
	11 05	0028	19.6	3.6		278	7.30	92	0.060	0.800	0.990	0.009
	11 05	0035	19.3	1.4		282	7.20	97	0.160	1.100	0.850	0.010

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/04/26	16 45	0000	0.041	18.6
	16 45	0006	0.044	
	16 45	0015	0.044	
	16 45	0022	0.042	
	16 45	0030	0.034	
	16 45	0040	0.032	
73/08/01	16 25	0000	0.031	7.7
	16 25	0005	0.025	
	16 25	0015	0.023	
	16 25	0025	0.037	
	16 25	0050	0.138	
73/10/10	11 05	0000	0.031	2.8
	11 05	0015	0.023	
	11 05	0028	0.030	
	11 05	0035	0.088	

STORET RETRIEVAL DATE 75/01/27

391403
40 10 34.0 082 52 12.0
HOOVER RESERVOIR
39041 OHIO

11EPALES 2111202
3 0039 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/04/26	17 10	0000	13.5		35	340	8.00	89	0.060	0.600	1.500	0.010
	17 10	0006	13.1	10.6		340	8.00	90	0.050	1.000	1.600	0.002
	17 10	0015	11.0	8.4		350	8.00	91	0.060	0.400	1.800	0.003
	17 10	0025	10.4	8.3		350	8.00	92	0.060	0.400	1.700	0.003
	17 10	0035	10.2	10.2		360	8.00	93	0.080	0.400	1.900	0.005
73/08/01	16 00	0000	25.6		36	286	8.60	85	0.060	1.000	1.570	0.006
	16 00	0005	25.1	7.7		283	8.10	83	0.050	0.700	1.590	0.006
	16 00	0015	24.2	2.3		301	7.50	92	0.080	0.800	1.600	0.007
	16 00	0032	20.5	0.7		291	7.30	106	0.420	1.300	0.860	0.010
73/10/10	13 05	0000	20.7	7.8	52	282	8.00	96	0.070	1.300	0.960	0.015
	13 05	0015	19.9	6.0		286	7.60	97	0.050	0.800	0.940	0.008
	13 05	0030	19.1	3.4		354	7.30	116	0.230	1.300	0.880	0.028

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/04/26	17 10	0000	0.052	4.4
	17 10	0006	0.040	
	17 10	0015	0.030	
	17 10	0025	0.028	
	17 10	0035	0.038	
73/08/01	16 00	0000	0.045	4.0
	16 00	0005	0.054	
	16 00	0015	0.037	
	16 00	0032	0.071	
73/10/10	13 05	0000	0.037	5.8
	13 05	0015	0.033	
	13 05	0030	0.131	

STORET RETRIEVAL DATE 75/01/27

391404
40 12 29.0 082 53 12.0
HOOVER RESERVOIR
39041 OHIO

11EPALES
3

2111202
0015 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/04/26	17 30	0000	13.6		16	400	7.00	107	0.100	0.900	1.300	0.014
	17 30	0006	13.4	8.8		380	7.50	107	0.100	0.600	1.300	0.003
	17 30	0011	13.3	8.7		380	7.60	106	0.100	0.600	1.400	0.012
73/08/01	15 40	0000	25.2		18	306	8.00	96	0.100	1.200	1.510	0.008
	15 40	0008	24.9	4.3		309	7.90	93	0.090	0.900	1.550	0.009
73/10/10	13 30	0000	21.0	9.6	20	299	8.50	100	0.060	1.400	0.680	0.018
	13 30	0005	20.0	7.4		399	7.90	116	0.080	0.800	0.730	0.013
	13 30	0008	19.6			448						

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/04/26	17 30	0000	0.080	7.2
	17 30	0006	0.081	
	17 30	0011	0.075	
73/08/01	15 40	0000	0.045	10.9
	15 40	0008	0.058	
73/10/10	13 30	0000	0.092	40.9
	13 30	0005	0.086	

APPENDIX E

TRIBUTARY DATA

STORET RETRIEVAL DATE 75/02/03

3914A1
40 13 30.0 082 52 44.0
BIG WALNUT CREEK
39015 7.5 GALENA
1/HOOVER RESERVOIR
2NDRY RD BRDG S END OF GALENA
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/05/05	09 00		0.720	0.660	0.019	0.026	0.055
73/06/02	14 15		0.910	1.680	0.056	0.072	0.115
73/07/09	13 40		1.020	1.890	0.118	0.069	0.115
73/08/06	09 40		0.450	1.780	0.330	0.210	0.270
73/09/06	14 40		0.820	1.485	0.230	0.500	0.620
73/10/15	13 32		0.210	1.400	0.072	0.126	0.175
73/11/04	08 55		2.900	0.850	0.108	0.056	0.085
73/12/02	09 30		1.800	0.800	0.036	0.048	0.075
74/01/06	14 21		1.260	0.400	0.072	0.044	0.065
74/02/03	10 40		1.260	0.300	0.025	0.040	0.050
74/02/17	09 10		0.980	0.400	0.020	0.005	0.035
74/03/03	09 50		1.600	0.600	0.055	0.020	0.095
74/03/17	14 20		2.180	1.100	0.080	0.035	0.115
74/04/07	14 28		1.260	0.700	0.035	0.040	0.090

STORET RETRIEVAL DATE 75/02/03

3914A2
40 06 10.0 0R2 53 02.0
BIG WALNUT CREEK
39 7.5 GALENA
0/HOOVER RESERVOIR
2NDRY RD BRDG .3 MI BELO HOOVER DAM
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/05/05	09 45		1.660	0.670	0.013	0.005K	0.030
73/06/02	14 45		1.500	1.470	0.039	0.011	0.025
73/07/09	13 00		1.500	1.540	0.048	0.023	0.040
73/08/06	09 10		1.360	1.050	0.040	0.016	0.050
73/09/06	14 05		1.260	0.440	0.036	0.015	0.035
73/10/15	14 06		0.920	0.600	0.017	0.008	0.010
73/11/04	08 30		0.920	0.550	0.014	0.008	0.030
73/12/02	10 00		1.060	0.600	0.014	0.016	0.030
74/01/06	15 00		1.520	0.600	0.028	0.028	0.060
74/02/03	11 15		1.760	0.700	0.050	0.040	0.060
74/02/17	08 25		1.850	0.800	0.020	0.035	0.075
74/03/03	10 35		1.900	0.600	0.030	0.030	0.100
74/03/17	14 50		1.920	0.800	0.040	0.035	0.075
74/04/07	13 58		1.760	0.700	0.025	0.015	0.020

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/02/03

391481
40 12 55.0 082 53 14.0
LITTLE WALNUT CREEK
39 7.5 GALENA
T/HOOVER RESERVOIR
ST HWY 3 BRDG 1 MI NW OF GALENA
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/05/05	08	50	1.000	1.050	0.048	0.010	0.045
73/06/02	14	10	0.680	1.180	0.060	0.012	0.050
73/07/09	13	50	1.100	2.310	0.097	0.018	0.115
73/08/06	09	50	0.820	2.100	0.046	0.011	0.095
73/09/06	14	50	0.340	1.600	0.034	0.022	0.150
73/10/15	13	20	0.038	4.100	0.260	0.085	0.260
73/11/04	09	10	1.680	0.950	0.072	0.028	0.105
73/12/02	09	15	2.200	0.800	0.148	0.028	0.055
74/01/06	14	05	1.260	0.300	0.040	0.008	0.025
74/02/03	10	30	1.180	0.400	0.040	0.010	0.035
74/02/17	09	00	1.200	0.400	0.022	0.035	0.065
74/03/03	09	36	1.600	0.300	0.017	0.010	0.065
74/03/17	14	15	2.500	1.000	0.065	0.020	0.095
74/04/07	14	36	1.260	0.900	0.045	0.020	0.100

STORET RETRIEVAL DATE 75/02/03

3914C1
40 09 04.0 082 50 27.0
DUNCAN RUN
39 7.5 GALENA
T/HOOVER RESERVOIR
2NORY RD BRDG SE EDGE OF HARLAM
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/05/05	09 25		1.800	0.920	0.023	0.013	0.035
73/06/02	14 30		1.960	1.320	0.215	0.017	0.040
73/07/09	13 20		0.169	1.380	0.063	0.039	0.125
73/08/06	09 22		0.088	0.650	0.089	0.024	0.050
73/09/06	14 17		1.240	4.000	0.050	0.110	0.280
73/10/15	13 50		0.150	1.050	0.042	0.025	0.050
73/11/04	08 45		2.100	0.500	0.016	0.032	0.060
73/12/02	10 50		1.340	0.800	0.024	0.044	0.085
74/01/06	14 45		1.280	0.250	0.024	0.020	0.067
74/02/03	11 00		1.360	0.300	0.020	0.020	0.032
74/02/17	08 45		1.300	0.400	0.010	0.015	0.035
74/03/03	10 10		1.340	0.500	0.025	0.015	0.065
74/03/17	14 35		2.520	1.000	0.050	0.035	0.100
74/04/07	14 13		1.900	1.100	0.060	0.035	0.108